OBSERVATIONS AT BALD HEAD, WESTERN AUSTRALIA

By G. BLACKBURN, Division of Soils, C.S.I.R.O., Adelaide, S.A.

King George Sound on the south coast of Western Australia is protected from the ocean by a peninsula (Fig. 1) which ends at Bald Head. This headland is a landmark for travellers visiting Albany by sea. It also constitutes a landmark in Australian natural history owing to its interest for so many pioneers in this field and its association with the first geological observations recorded for Australia. The men who have climbed over this rugged headland include George Vancouver and Matthew Flinders, famous explorers; Robert Brown and Allan Cunningham, botanists; Jean Rene Constant Quoy and Joseph Paul Gaimard, naturalists; Charles Darwin; and Robert Fitzroy, captain of H.M.S. *Beagle*.

Fig. 1. The view to Bald Head, W.A., south-east from Mt. Clarence at Albany. The entrance to King George Sound lies between the Bald Head promontory and Breaksea Is. at the left. The jetty at the right lies in Princess Royal Harbour.

Captain George Vancouver discovered King George Sound in 1791 and started the interest in Bald Head with his report of the corals found on its summit, "which is sufficiently above the level of the sea to be seen at 12 or 14 leagues distance" (Vancouver 1801). His report was regarded by Ralph Tate (1893) as the first recorded geological observation for Australia. Matthew Flinders (1814) supported Vancouver's findings but others intrigued by these observations found no corals there, only curious petrifactions around plant roots in the limestone. In 1803 the French naturalist François Péron rested for several days only a few miles from Bald Head but was

then unaware of previous interest in its "corals" and failed to visit this site. He realized later what a chance he had missed and was then obliged to accept Vancouver's claim (Péron and Freycinet, 1816). His conclusions on the coastal limestone certainly would have been improved if he had got to Bald Head.

Allan Cunningham, who later discovered the Darling Downs in Queensland, visited Bald Head on a hot day in December 1821 during his tour with Captain Phillip Parker King (King, 1827). He collected plants there, including *Baeckea*, *Candollea*, and *Scaevola*, and probably also took the ramified calcareous specimens described from this site by William Henry Fitton (Fitton, 1826; King, 1827). These appear to have been the bodies accepted by Vancouver as corals. Quoy and Gaimard searched unsuccessfully for corals on the summit of Bald Head (Quoy and Gaimard, 1833), but they found species of land snails there (Quoy and Gaimard, 1832), which they described in the excellent reports of the voyage of *L'Astrolabe* (1826-29). Charles Darwin made his visit to the landmark in 1836 at a time when he was at grips with the problem of the origin of coral reefs. Obviously he must have been keen to check the early reports of Vancouver and Flinders; it is doubtful if he was aware of the other work by Cunningham, Quoy and Gaimard. He identified the "corals" as concentrations around roots in the dune limestone. His detailed descriptions (Darwin, 1844) and general account in the "Voyage of the *Beagle*" (Darwin, 1860) are known to many. The occurrence of plant roots in such concentrations from Bald Head is shown in Figure 2.

Fig. 2. Portions of calcareous concretions from Bald Head, W.A., showing enclosed root material. The coin is one inch in diameter.

The actual proeess of formation for concentrations of this type has not been established with eertainty, despite the suggestions made by Darwin, Northrop (1890), Hall (1902) and others. They oeeur also around blaek carbonaeeous material, aeeording to Boutakoff (1963), and another report from Victoria (Keble, 1950) indicates that similar struetures occur on leaves which have been buried by advaneing dunes and re-exposed later. The environment of living or decomposing organie matter could well be expected to provide conditions in which limestone would dissolve in the presence of water. It is the symmetrical deposition of caleium carbonate around even dead organic matter whieh arouses attention. Possibly the formation of sueh eoneretions eould be investigated experimentally.

Bald Head has a basement of granite which rises steeply from the sea to heights occasionally reaching 700 ft. The dune limestone plastered over this foundation is now being removed by marine and wind erosion. The extremity of the promontory is a bare granite knob approximately 500 ft. high, which is identified on the Albany 1 mile series of the military survey as Bald Head. In view of the Vaneouver eharts, e.g. as reprodueed by Beautemps-Beaupre (1807), it is doubtful whether this knob is that to which Vaneouver referred. Probably he gave the name to the higher part nearby where a hill 750 ft. high shows a distinct bald head due to erosion of its sandy soil and limestone. Trails of sand run down its vegetated slopes to the sea and can be seen plainly from the entranee to the Sound.

The area of approximately one sq. mile which contains Bald Head is connected to the larger peninsula by a razor-back isthmus of dune limestone half a mile long and 200 ft. high. This is a superb introduction to Bald Head for the traveller by land. Here storms frem the oeean side may blast at the coast and at the traveller too, while the view inland overlooks the ealm waters of King George Sound and Princess Royal Harbour. On this side the water may be disturbed during storms only by eddies which oeeasionally whisk up spray. This introduction traverses slopes which have discouraged some would-be visitors who have toiled as far as Isthmus Hill. Certainly William Westall, the artist in Flinders' expedition, paused on this hill to sketch the view while his eaptain and Robert Brown, the botanist, went on their way aeross the razor-back. One of the Australian landseape paintings by Westall shows this seene of Bald Head with the ocean to the right and the Sound to the left; it is represented mistakenly in the reeent publieation on Westall (Perry and Simpson, 1962) as relating to another view at King George Sound. That book shows that Westall made many sketches near King George Sound ineluding several from the peninsula near Bald Head. His subsequent use of his drawings creates a few ecological puzzles, now explained in the book.

Almost everywhere on the Bald Head promontory there are easy views over the wind-blasted vegetation in whieh specimens of *Agonis flexuosa* rise only to 18 in. Sheltered spots among the steep sand dunes at the crest earry vegetatien which by its long evasion of fires now forms dense thickets including many examples of the same species over 15 ft. high.

The geologists Jutson and Simpson (1917) gave a short account of the Albany district in which they named for Darwin the entire peninsula on the south side of King George Sound and Princess Royal Harbour. Unfortunately this name has failed to gain recognition. It would be appropriate to show the significanee of Bald Head by the erection on this peninsula of a suitable memorial. This should recognize the interest taken in the landmark by the important contributors to Australian natural history mentioned above.

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